AMENDMENTS TO THE SPECIFICATION

Kindly amend the specification as follows:

[0025] Figures 8a[[, 8b,]] and 8[[c]]b are diagrams illustrating different views of one embodiment[[s]] of an antenna[[s]] comprising a metallized membrane according to the present invention.

[0026] Figure 9[[a, 9b, and 9c]] illustrates one embodiment[[s]] of layers in a keyswitch matrix assembly membrane system having printed antenna components in accordance with the present invention.

[0040] In a membrane type keyswitch matrix 315, the layers (e.g., top layer 425a ~~420a~~, bottom layer 425b ~~420b~~, collectively 425 ~~420~~, and the key switch mechanism layer 430) are typically configured from a flexible substrate material, for example, film membrane, flexible polymer, a fabric, plastic rubber, or the like that is very flexible in all axis, including the Z-axis. Preferably, the keyswitch PCM, are made of substantially flexible materials for both the membrane layers and the conductive traces and contacts comprised in the circuitry thereon. Flexible materials for the traces, contacts, and the like include flexible wire, conductive ink, tape wire, or the like. Keyswitch PCMs can be thinner, lighter weight, and cheaper than PCB alternatives. In addition, flexible keyswitch PCMs are more versatile and can be used in a wider range of enclosures of different shapes and sizes, for example, in the top convex portion of a mouse, in keyboards that are not flat in one single plane but instead convex or concave keyboards, e.g., ergonomic keyboards, specialty keyboards, or the like. Further, interlayer connections may be simpler to produce during manufacturing. However, in some embodiments the membrane layers may be substantially rigid, e.g., rigid plastic, and conductive traces on the

membrane layers, whether flexible or not, may also be substantially rigid, e.g., metallic trace, wire, or the like. Typically, the keyswitch matrix subsystem 315 is configured in size to have a perimeter that is substantially the interior perimeter of the wireless device, for example, the perimeter of the RF keyboard 110.

[0044] The keyswitch matrix subsystem 315 includes a set of key matrix layers 425 ~~420~~ and one or more keyswitch mechanism layers 430. For example, a first layer 425a ~~420a~~ includes conductive rows 460a, a second layer 425b ~~420b~~ includes conductive columns 460b, which collectively make up a conductive electrical matrix 460. The conductive rows and columns may be made up of traces, either deposited or printed, or small wires, e.g., tape wire. Further, the keyswitch matrix subsystem 315 may include a single keyswitch mechanism layer 430 to selectively isolate the rows 460a from the columns 460b. The keyswitch mechanism layer 430 can be configured to have openings at contact points 450 such that when the keyswitch matrix subsystem 315 is assembled in a keyboard 110, the contact points 450 are located under each of the keyboard keys 215.

[0045] The key matrix layers 425 ~~420~~ and keyswitch mechanism layers 430 may be separate layers or may be integrated together into an electrical matrix 460. In a separate layer configuration the key matrix layers 425 ~~420~~ or the keyswitch mechanism layers 430 may be separated into additional layers, for example, a first layer may include rows for an electrical matrix 460a and a second layer may include columns for the electrical matrix 460b or alternatively, both layers can include both rows and columns for an electrical matrix 460. In addition, it is noted that if a flexible material is used for the keyswitch matrix subsystem 315, a rigid member 320, for example, a rigid polymer, may be used as backing to provide additional structural support within the RF keyboard 110.

[0046] The key switch mechanism layers 430 may be a conventional mechanism, for example, a rubber dome mechanism, a metal contact mechanism, a membrane mechanism, a foam element mechanism, or a capacitive mechanism, that electrically couples conductive rows 460a to columns 460b in separate key matrix layers 425 ~~420~~. The keyswitch mechanism layers 430 can be in the keyswitch pad 310 as discussed above or implemented with a set of membrane layers in the keyswitch matrix subsystem 315 actuated directly by the keys 215 in the keyboard 110.

[0047] The key matrix layers 425 ~~420~~ and the keyswitch mechanism layers 430 make up the electrical matrix 460. The electrical matrix 460 may be a grid of circuitry that includes two or more rows 460a and two or more columns 460b of electrical lines or traces. Each intersection of a row 460a and a column 460b of the electrical matrix 460 is configured to lie under a key on the keyboard and forms a switch point 450 that is closable with key pressure. The key matrix layers 425 ~~420~~ also include at least part of an antenna 490. The components (parts or elements) of the antenna 490 may be on any one or more surfaces of any one or more of the membranes in the keyswitch matrix subassembly 315. In accordance with the present invention, the parts or elements of the antenna 490 may also be printed with conductive printing substances, such as, metallic inks. The membranes printed with the metallic ink will be referred to as a metallized membranes 321, that is, a metallized membrane 321 is a membrane having a top side or surface an a bottom side or surface that has a geometric structure printed on either or both sides with a conductive ink. For ease of manufacturing, both, the electrical matrix 460 and the parts of the antenna 490 located on the metallized membranes 321 can be made with the same process, for example, depositing metallic trace or wire, printing with conductive ink, or a combination thereof.

[0049] The antenna 490 may be configured as a loop antenna, e.g., along a substantially outer perimeter or edge of a metallized membrane 321, or in a spiral printed geometric shape on the top surface of the top key matrix layer 425a ~~420a~~ (metallized membrane 321) to provide a large antenna loop length. Figure 4b illustrates a conceptual view of one embodiment of a keyswitch matrix subsystem 315 in accordance with the present invention. The key switch matrix subsystem 315 includes the electrical matrix 460 and an antenna 490 along an outer portion of a metallized membrane 321 in the keyswitch matrix subsystem 315. The metallized membrane 321 may be any one of the layers 425 ~~420~~/430 in the keyswitch matrix subsystem 315 or several of them coupled together to form the antenna 490.

[0051] In addition, one embodiment of the keyswitch matrix subsystem 315 includes other antenna components printed in one or more metallized membranes 321. Figure 5 shows an antenna 490 that includes a conductive plane printed by entirely coating the top side of the keyswitch mechanism layer 430 (metallized membrane 321) with a conductive ink. Since the conductive plane is on the top side of the keyswitch mechanism layer 430, it does not cause a short circuit in the lower layer 425b ~~420b~~, and since the top layer 425a ~~420a~~ only has conduction points located "above" the switch points 450 in the keyswitch mechanism layer 430, there is no potential for shorting the top layer 425a ~~420a~~ by coming in contact with the conductive ink. Conductive planes, such as for example ground planes, are typically connected to antennas to improve performance of the radio frequency transmissions. These conductive planes can be made in several ways, for example, with metallic plates, coated printed circuit boards, printed membranes, and the like. In one embodiment of the present invention, a conductive ground plane is printed with conductive ink on a surface of a metallized membrane 321.

[0061] The cut-out space 322c between the first antenna portion or component 322a and the second antenna portion or component 322c is part of the surface of the metallized membrane 321 that is not printed with conductive ink when the shape or pattern is formed. The cut-out space 322c can provide for a large antenna loop length for transmitting RF signals. Further, the geometries on the metallized membrane 321 may be printed to include more than two antenna portions to form a cut-out space having two or more turns as illustrated in the first antenna portion or component 322a shown in Figure 7c. Further, it should be noted that the portions or elements of the antenna 490 need not be printed in the same side of metallized membrane 231, for example, in Figure 7c dashed line 322b illustrates a printed trace or second antenna portion or component 322b in the back side of metallized membrane 321. In addition, the antenna portions can be printed on different layers of the keyswitch matrix 315. For example, a first portion or component can be printed in the bottom side of the top membrane layer 425a ~~420a~~ and the second antenna component 322b can be printed in the keyswitch mechanism membrane 430 in a shape or pattern such that the two portions only overlap in a contact point.